

What is claimed is:

1. An optical amplifier comprising

An optical signal input for receiving an input optical signal to be amplified;

A pumping laser input for receiving a pumping laser input signal for use in

5 amplifying the input optical signal;

Means for measuring a power of the pumping laser input signal;

A combiner for combining the pumping laser input signal and the input optical signal;

An EDFA having an input coupled to the output of the combiner and an output

10 coupled to a splitter, the splitter dividing out a portion of the signal output from the EDFA and attributable to a pump residual power of the pumping laser after amplification by the EDFA;

Means for measuring the pump residual power; and

Feedback means for adjusting a current of the pumping laser using the residual power and the pumping laser input signal power.

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2. The optical amplifier of claim 1 further comprising a pumping laser having a first frequency and coupled to the pumping laser input.

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3. The optical amplifier of claim 1 wherein the means for measuring a power is a photodiode.

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4. The optical amplifier of claim 1 further comprising a gain flattening filter (GFF) coupled to an output of the splitter for receiving and filtering a remainder signal attributable to an amplified input signal received from the splitter and providing a flattened output signal.

5. The optical amplifier of claim 4 further comprising a variable optical attenuator coupled to the output of the GFF for variably adjusting a received signal to achieve constant power output.

6. The optical amplifier of claim 1 wherein the combiner is a wave division multiplexing (WDM) combiner.
7. The optical amplifier of claim 6 wherein the WDM combiner combines an input signal of substantially 1550 NM with a pumping laser input of substantially 980 NM.
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8. The optical amplifier of claim 1 wherein the splitter is a wave division multiplexing (WDM) splitter.
- 10 9. The optical amplifier of claim 1 wherein the WDM splitter splits an output of the EDFA into a first signal having a first frequency and a second signal having a second frequency, where the first signal has a frequency that is substantially 1550 NM and the second frequency is substantially 980 NM.
- 15 10. The optical amplifier of claim 1 wherein the WDM splitter splits an output of the EDFA into a first signal having a first frequency and associated with an amplified version of the input signal and a second signal having a second frequency and associated with the pumping laser signal
- 20 11. An optical amplifier comprising
An optical signal input for receiving an input optical signal to be amplified;
A pumping source input for receiving a pumping source input signal for use in amplifying the input optical signal;
A combiner for combining the pumping source input signal and the input optical signal;
- 25 An EDFA having an input coupled to the output of the combiner and an output coupled to a splitter, the splitter dividing out a portion of the signal output from the EDFA and attributable to a pump residual of the pumping laser after amplification by the EDFA;
Error correction means for measuring the pump residual and adjusting the pumping input signal provided by the pumping source.

12. The optical amplifier of claim 11 further comprising a pumping laser having a first frequency and coupled to the pumping source input.

13. The optical amplifier of claim 11 wherein the error correction means includes a
5 photodiode for measuring a power of a pump residual.

14. The optical amplifier of claim 11 further comprising a gain flattening filter (GFF) coupled to an output of the splitter for receiving and filtering a remainder signal attributable to an amplified input signal received from the splitter and providing a flattened output signal.

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15. The optical amplifier of claim 14 further comprising a variable optical attenuator coupled to the output of the GFF for variably adjusting a received signal to achieve constant power output.

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16. The optical amplifier of claim 11 wherein the combiner is a wave division multiplexing (WDM) combiner.

17. The optical amplifier of claim 16 wherein the WDM combiner combines an input signal of substantially 1550 NM with a pumping source input of substantially 980 NM.

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18. The optical amplifier of claim 11 wherein the splitter is a wave division multiplexing (WDM) splitter.

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19. The optical amplifier of claim 11 wherein the WDM splitter splits an output of the EDFA into a first signal having a first frequency and a second signal having a second frequency, where the first signal has a frequency that is substantially 1550 NM and the second frequency is substantially 980 NM.

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20. The optical amplifier of claim 11 wherein the WDM splitter splits an output of the EDFA into a first signal having a first frequency and associated with an amplified version of the input

signal and a second signal having a second frequency and associated with the pumping source signal.

21. An optical amplifier comprising:

5 An optical signal input for receiving an input optical signal to be amplified;

A pumping source input for receiving a pumping source input signal for use in amplifying the input optical signal;

An EDFA operable to use the pumping source input signal to amplify the input optical signal producing an output optical signal; and

10 An error correction controller for measuring the pump residual and adjusting the pumping input signal provided by the pumping source.

22. A method for amplifying an optical signal using an EDFA, comprising

Amplifying an input signal using an EDFA producing an amplified output signal; and

15 Measuring a pump residual power component of the amplified output signal and using the measured pump residual power component to adjust a performance of the EDFA.